II. REMARKS

By the present paper, claims 3, 7, 8 and 10 have been cancelled without prejudice, claims 1 and 12 have been amended, and new claims 14 and 15 have been added. More specifically, independent claim 1 has been amended to incorporate the subject matter of previous claim 3, and to recite that the mass flow rate sensor part is "operable to measure mass flow rate of fluid and to provide a first output corresponding to the measured mass flow rate" and that the pressure sensor part is "operable to measure pressure of fluid and to provide a second output corresponding to the measured pressure" as supported by ¶¶ [0025] to [0028] of Applicants' disclosure as originally filed.

Claim 12 has been amended to depend upon claim 1. Therefore, the present amendment has no further limiting effect on the scope of claim 12.

New claim 14 depends upon claim 1, and additionally recites

> "wherein the mass flow rate sensor part is disposed to provide the first output corresponding to the measured mass flow rate to a first differential amplifying circuit, and the pressure sensor part is disposed to provide the second output corresponding to the measured pressure to a second differential amplifying circuit,"

as supported by ¶¶ [0045] and [0046], and by Figure 6, of Applicants' disclosure as originally filed.

New claim 15 depends upon claim 14, and additionally recites

> "wherein the first differential amplifying circuit is disposed to output a third output to an offset adjustment circuit, and the second differential amplifying circuit is disposed to output a fourth output to a signal treatment circuit, and the signal treatment circuit is disposed to output a fifth output to the offset adjustment circuit so that the output drift of the mass flow rate sensor part, due to pressure changes of the fluid measured by the mass flow rate sensor part, is corrected by the second output of the pressure sensor part,"

as supported by ¶¶ [0046]-[0050], and by Figure 6, of Applicants' disclosure as originally filed.

The present amendment adds no new matter to the above-captioned application.

A. The Invention

The present invention broadly pertains to a corrosion-resistant metal made sensor for measuring mass flow rate and pressure of fluid, such as may be used in a fluid supply line of a semiconductor manufacturing facility. In accordance with an embodiment of the present invention, a corrosion-resistant metal made sensor for measuring mass flow rate and pressure of fluid is provided that includes features recited by independent claim 1. Various other embodiments, in accordance with the present invention, are recited by the dependent claims.

Advantages provided by the various embodiments of the present invention include that a corrosion-resistant metal made sensor for measuring mass flow rate and pressure of fluid is provided that avoids shortcomings of capillary thermal type mass flow rate sensors and is corrosion resistant.

B. The Rejections

Claims 1, 2, 5, 6 and 11 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Seki et al. (U.S. Patent 6,981,410 B2, hereafter the "Seki Patent") in view of James (U.S. Patent Application Publication No. 2002/0100316, hereafter the "James Publication"). Claims 3, 7 and 12 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Seki Patent in view of the James Publication, and further in view of Kuno et al. (U.S. Patent 3,737,684). Claims 1-3, 5-7, 11 and 12 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Seki Patent in view of "Kuno (US 3,737,684) taken with James" Publication. Claims 1-3, 5-7, 11 and 12 also stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Seki Patent in view of the Kuno Patent. Claims 4, 8, 9, 10 and 13 stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Seki Patent in view of the James Publication, or alternatively over the

combination of the Seki Patent, the James Publication and the Kuno Patent, and further in view of the Kinard (U.S. Patent 5,393,351, hereafter the "Kinard Patent"). Claims 4, 8, 9, 10 and 13 also stand rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over the Seki Patent in view of the Kuno Patent, and further in view of the Kinard Patent.

Applicants respectfully traverse the Examiner's rejections and request reconsideration of the above-captioned application for the following reasons.

C. Applicants' Arguments

A prima facie case of obviousness requires a showing that the scope and content of the prior art teaches each and every element of the claimed invention, and that the prior art provides some teaching, suggestion or motivation, or other legitimate reason, for combining the references in the manner claimed. KSR International Co. v. Teleflex Inc., 127 S.Ct. 1727, 1739-41 (2007); In re Oetiker, 24 U.S.P.Q.2d 1443 (Fed. Cir. 1992). In this case, the Examiner has failed to establish a prima facie case of obviousness against Applicants' claimed invention because the Seki Patent, the James Publication, the Kuno Patent, and Kinard Patent, either alone or taken in combination, fails to teach each and every limitation of the claims.

i. The Seki Patent

The Seki Patent discloses a "flow sensor and method of manufacturing the same," wherein the flow sensor (100) includes a substrate (124), an electrical insulating film (113), and a flow velocity detection mechanism (112) as shown in Figure 1 (reproduced below for the Examiner's convenience), (See Abstract of the Seki Patent, and col. 3, lines 6-13). In the substrate (124), a diaphragm portion (124B) having a first surface in contact with a measurement target fluid and a thick fixing portion (124A) surrounding the diaphragm portion (124B) are integrally formed (See Abstract of the Seki Patent, and col. 3, lines 14-

31). The Seki Patent discloses that the electrical insulating film (113) is formed on a second surface of the diaphragm portion (124B), which is on a side opposite to the first surface (See Abstract of the Seki Patent). According to the Seki Patent, the flow velocity detection mechanism (112) is arranged on the electrical insulating film (113), (See Abstract of the Seki Patent). The Seki Patent also discloses a method of manufacturing a flow sensor (Seki Patent, see, e.g., Figures 12A to 12G, 13A to 13C, 14A to 14C, 15A to 15C, and 16A to 16D).

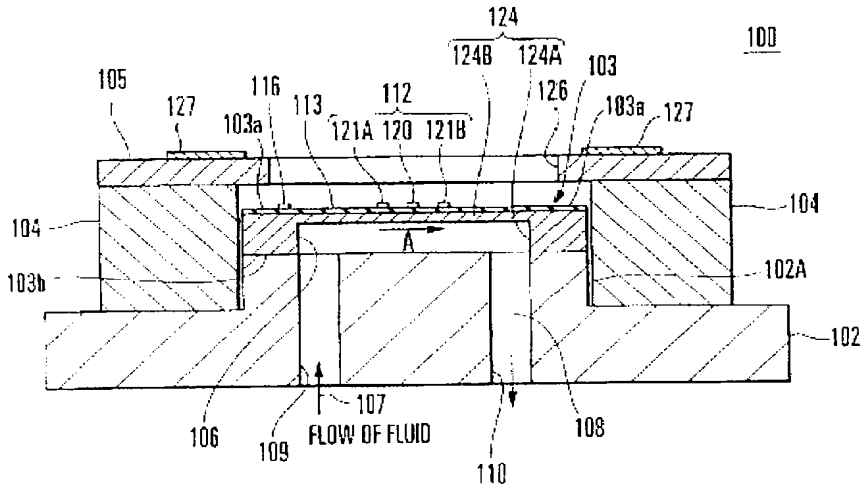

FIG. 1

As admitted by the Examiner (Office Action, dated March 20, 2009, at 3, line 10; at 4, lines 3-4 and lines 8-9; at 5, lines 11-12; and at 6, line 9), the Seki Patent does not teach, or suggest, (i) "a pressure sensor part" as recited by independent claim 1, (ii) "a fluid controller" as recited by claims 5 and 11, (iii) "a metal gasket" as recited by claim 6, (iv) that "output drift of the mass flow rate sensor part, due to pressure changes of the fluid measured by the mass flow rate sensor part, is corrected by the second output of the pressure sensor part" as recited by claim 1, and (v) "a protection film covering the insulating film and the metal film" as recited by claim 4.

ii. The James Publication

The James Publication discloses a "fluid flow sensor," which pertains to a flow sensor for determining the velocity and direction of a fluid flow, wherein the sensor includes a substrate, a heat source located on the substrate, and a first and a second heat sensor located on the substrate to detect at least a portion of heat generated by the heat source (See Abstract of the James Publication). According to the James Publication, the first and second heat sensors and the heat source are arranged in a non-linear orientation (See Abstract of the James Publication).

As admitted by the Examiner (Office Action, mailed September 19, 2008, at 10, line 1; and at 12, lines 13-14; and Office Action, mailed March 20, 2009, at 5, lines 11-12), the James Publication does not teach, or suggest, (i) "a corrosion-resistant metal substrate" as recited by independent claim 1, and (ii) "wherein output drift of the mass flow rate sensor part due to pressure changes of fluid is corrected by output of the pressure sensor part" as recited by previous claim 3 (which is now subject matter incorporated into independent claim 1). The Examiner also admits that the James Publication does not teach, or suggest, (iii) "a fluid controller" as recited by claims 5 and 11, (iv) "a metal gasket" as recited by claim 6, (Office Action, dated March 20, 2009, at 4, lines 3-4 and lines 8-9).

iii. The Kuno Patent

The Kuno Patent discloses a "system for compensating for drift in semiconductor transducer," wherein the drift compensating system includes a detecting circuit having at least one semiconductor element (i.e., strain gages G_1 and G_2) to generate an output in proportion to a physical quantity to be applied thereto (i.e., compressive strain due to flexure of diaphragm (3)), a first terminal (D) for providing the output, a switching element (S), a memory circuit (i.e., a capacitor (C), transistor Tr_1, and resistor R_1) connected to the first

terminal (D) through the switching element (S) for memorizing the output upon closure of the switching element (S), and a second terminal (F) connected to the memory circuit (See Abstract of the Kuno Patent, and col. 3, lines 5-15, and col. 3, lines 59, to col. 4, line 33, and Figure 5). Figure 5 of the Kuno Patent illustrates the drift compensating circuit in accordance with a first embodiment (Kuno Patent, col. 2, lines 52-53), and is reproduced below for the Examiner's convenience. Figures 7, 8, 9 and 10 of the Kuno Patent illustrate other embodiments of the drift compensating circuit (Kuno Patent, col. 2, lines 55-57).

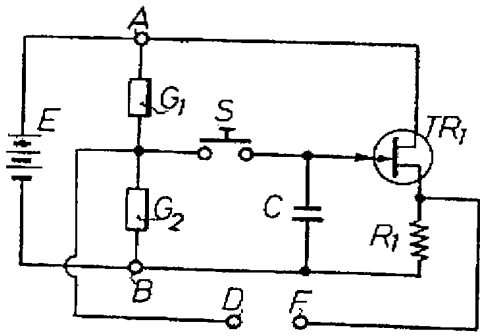

Figure 5 of the Kuno Patent

Upon closure of the switching element (S), the output is applied to the memory circuit to render the first and second terminals (D), (F) to be at the same potential to thereby cancel any drift, and upon a subsequent opening of the switching element (S), a potential difference appears between the terminals in accordance with any change of the output (See Abstract of the Kuno Patent). Thus, the Kuno Patent merely discloses a system for compensating drift in semiconductor transducers, G_1 and G_2, by using a switching element (S) and a memory circuit as shown in Figures 5 and 7-10. The Examiner erroneously contends that the Kuno Patent discloses at col. 9, lines 35-47, correcting drift in the temperature-resistance characteristics of temperature sensors using a pressure sensor (Office Action, dated March 20, 2009, at 4, line 18, to 5, line 2).

The Examiner has misconstrued col. 9, lines 35-47, of the Kuno Patent, which states as follows:

> "Furthermore, the invention may be applied to compensate for drift due to irrelevant causes, such as temperature change, not only in semiconductor pressure transducers and semiconductor accelerometers, but also in semiconductor displacement gages, semiconductor load gages and other semiconductor transducers utilizing the strain-resistance characteristic of the semiconductor. Likewise the invention may be equally applied to compensate for drift due to other irrelevant causes such as change in external pressure in semiconductor transducers utilizing the temperature-resistance characteristic of the semiconductor and using a semiconductor element as a thermistor."

A person of ordinary skill in the art would instantly realize that this passage of Kuno merely discloses the possibility of replacing the semiconductor gages, G_1 and G_2, by another semiconductor element, such as a thermistor. In such a case, the transducer will be used as a temperature sensor (and not as a pressure sensor), and the drift of the temperature sensor due to changes in external pressure will be compensated by the switching element (S) and the memory circuit disclosed by the Kuno Patent.

Thus, as would be immediately realized by a person of ordinary skill in the art, the Kuno Patent may disclose using a switching element (S) and a memory circuit to compensate for the drift of a temperature sensor, but it does not teach, or even suggest, "wherein output drift of the mass flow rate sensor part, due to pressure changes of the fluid measured by the mass flow rate sensor part, is corrected by the second output of the pressure sensor part" as recited by independent claim 1. In other words, the Kuno Patent discloses correcting for drift using a switching element and a stored voltage, stored on a capacitor. On the other hand, the present invention corrects for drift of a mass flow rate sensor part using output from a pressure sensor part, which corrects drift in a substantially different manner using substantially different structures than those disclosed by the Kuno Patent.

iv. The Kinard Patent

The Kinard Patent discloses "multilayer film multijunction thermal converters" formed in an integral multifilm membrane form over a through opening in a nonmagnetic, dielectric substrate (See Abstract of the Kinard Patent). The Kinard Patent discloses that, through the use of conventional photolithographic and etching techniques, compact, rugged and precise integrated structures are formed to include either single linear elongate heater elements, bifilar or trifilar heater elements, and multijunction thermopiles (See Abstract of the Kinard Patent). According to the Kinard Patent, disposition of the heater element and hot junctions of the thermopiles over a through opening in the substrate, with the cold junctions of the thermopiles disposed over the substrate thickness, enables the heating element to provide a substantially isothermal uniform heating of the thermocouple hot junctions to obtain high thermal efficiency and reduce Thompson and Peltier heating effects (See Abstract of the Kinard Patent). The Kinard Patent also discloses that forming the essential elements into an integrated multifilm membrane makes possible minimization of interconnections between the elements, and this results in minimized reactance (See Abstract of the Kinard Patent).

In Figure 3 of the Kinard Patent, Kinard discloses protective silicon dioxide layers (266) and (268) that may be used to protect thermocouples (208) and (210), (Kinard Patent, col. 11, lines 8-17).

v. The Examiner's Official Notices

With respect to independent claim 1, the Examiner contends that it is well-known in the art to use thin metal films to form strain sensors (Office Action, dated March 20, 2009, at 3, lines 14-16). With respect to claims 5 and 11, the Examiner contends it is well-known in the art to use mass flow controllers (Office Action, dated March 20, 2009, at 4, lines 4-6).

With respect to claim 6, the Examiner contends it is well-known in the art to use metal gaskets (Office Action, dated March 20, 2009, at 4, lines 9-14). To the extent that the Examiner is taking "Official Notice" that the use of thin metal films forming strain sensors, and that mass flow controllers and metal gaskets, are well-known in the art, Applicants object on the grounds that the apparent Official Notices are numerous and overly broad.

Applicants' remind the Examiner that the Administrative Procedure Act requires that the Examiner's rejections employ "reasoned decision making" based on evidence from a fully developed administrative record. In re Lee, 61 U.S.P.Q.2d 1430, 1433 (Fed. Cir. 2002). Patentability determinations that are based on what the Examiner believes is "basic knowledge" and "common sense," and that otherwise lacks substantial evidentiary support, are impermissible. In re Zurko, 59 U.S.P.Q.2d 1693, 1697 (Fed.Cir. 2001). Therefore, Applicants' respectfully traverse the Examiner's Section 103 rejection of claims 1, 5, 6 and 11 on the grounds that the multiple "Official Notices" lack "substantial evidentiary support." Therefore, the Examiner must now adduce substantial evidentiary support (e.g., produce a prior art reference) with respect to the subject matter claimed, or withdraw the Section 103 rejection standing against claims 1, 5, 6 and 11.

vi. Summary of the Disclosures

The combination of the Seki Patent, the James Publication, the Kuno Patent and the Kinard Patent fails to teach, or suggest, (i) "a thin film forming a strain sensor element installed on the back face side of the fluid contacting surface of the corrosion-resistant metal substrate" and that (ii) "output drift of the mass flow rate sensor part, due to pressure changes of the fluid measured by the mass flow rate sensor part, is corrected by the second output of the pressure sensor part" as recited by independent claim 1. The combination of the Seki

Patent, the James Publication, the Kuno Patent and the Kinard Patent fails to teach, or suggest, (iii)

> "wherein the mass flow rate sensor part is disposed to provide the first output corresponding to the measured mass flow rate to a first differential amplifying circuit, and the pressure sensor part is disposed to provide the second output corresponding to the measured pressure to a second differential amplifying circuit,"

as recited by new dependent claim 14, and (iv)

> "wherein the first differential amplifying circuit is disposed to output a third output to an offset adjustment circuit, and the second differential amplifying circuit is disposed to output a fourth output to a signal treatment circuit, and the signal treatment circuit is disposed to output a fifth output to the offset adjustment circuit so that the output drift of the mass flow rate sensor part, due to pressure changes of the fluid measured by the mass flow rate sensor part, is corrected by the second output of the pressure sensor part,"

as recited by new dependent claim 15.

In particular, the Kuno Patent discloses an assembly that compensates for drift in that the assembly employs a switching means and a memory circuit. The Kuno Patent does not teach, or suggest, using output from a pressure sensor to correct output drift experienced by a mass flow rate sensor. The presently claimed invention, on the other hand, employs a pressure sensor part, used with a mass flow rate sensor part, to compensate the drift amount of the mass flow rate sensor part in order to increase the accuracy of the mass flow rate sensor part against fluctuation in fluid pressure.

For all of the above reasons, the Examiner has failed to establish a prima facie case of obviousness against Applicants' claims 1, 2, 4-6, 9 and 11-15.

III. CONCLUSION

In view of the present amendment, the Examiner has failed to establish a prima facie case of obviousness because the Seki Patent, the James Publication, the Kuno Patent and the Kinard Patent, either alone or in combination, fails to teach, or suggest, (i) "a thin film

forming a strain sensor element installed on the back face side of the fluid contacting surface of the corrosion-resistant metal substrate" and that (ii) "output drift of the mass flow rate sensor part, due to pressure changes of the fluid measured by the mass flow rate sensor part, is corrected by the second output of the pressure sensor part" as recited by independent claim 1. Furthermore, the combination of the Seki Patent, the James Publication, the Kuno Patent and the Kinard Patent fails to teach, or suggest, the subject matter recited by new claims 14 and 15.

For all of the above reasons, claims 1, 2, 4-6, 9 and 11-15 are in condition for allowance, and a prompt notice of allowance is earnestly solicited.

The below-signed attorney for Applicants welcomes any questions.

Respectfully submitted,

GRIFFIN & SZIPL, P.C.

Joerg-Uwe Szipl
Registration No. 31,799

GRIFFIN & SZIPL, P.C.
Suite PH-1
2300 Ninth Street, South
Arlington, VA 22204

Telephone: (703) 979-5700
Facsimile: (703) 979-7429
Email: GandS@szipl.com
Customer No.: 24203